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**Report No. 12118**

**PROJECT COMPLETION REPORT**

**REPUBLIC OF BENIN**

**SEME OIL FIELD DEVELOPMENT PROJECT  
(CREDIT 1503-BEN)**

**JUNE 30, 1993**

**Industry and Energy Operations Division  
Country Department IV  
Africa Regional Office**

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## **ACRONYMS**

### **Institutional Acronyms**

<b>ECGD</b>	<b>British Export Credits Guarantee Department</b>
<b>EIB</b>	<b>European Investment Bank</b>
<b>GIEK</b>	<b>Guaranti-Instituttet for Export Kreditt (Export Credit Guarantee Institute - Norway)</b>
<b>MIME</b>	<b>Ministry of Industry, Mines and Energy</b>
<b>SPB</b>	<b>Saga Petroleum Benin, a.s.</b>
<b>PPS</b>	<b>Projet Petrolier de Seme</b>

### **Technical Abbreviations**

<b>3-D seismic</b>	<b>Three-dimensional seismic</b>
<b>bopd</b>	<b>Barrels of Oil per Day</b>
<b>OWC</b>	<b>Oil Water Contact</b>

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THE WORLD BANK  
Washington, D.C. 20433  
U.S.A.

Office of Director-General  
Operations Evaluation

June 30, 1993

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Benin  
Seme Oil Field Development Project (Credit 1503-BEN)

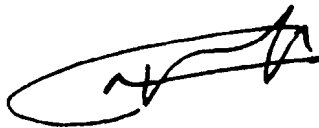
Attached is the "Project Completion Report on Benin - Seme Oil Field Development Project (Credit 1503-BEN)" prepared by the Africa Regional Office, with Part II contributed by the Borrower. The PCR clearly identifies the implementation problems encountered, and recommends a reasonable course of action for the future. Its presentation of the financial and economic benefit cost streams does not follow standard Bank format and is, therefore, somewhat confusing.

The project was to increase the output from a Government-owned offshore oil field which, in its initial development phase had encountered serious technical, managerial and financial setbacks. Although the project produced only 60% of the anticipated output, and the average price for oil declined substantially over the project life, the economic rate of return for the new investment was acceptable, and the Government's share of the oil produced was increased through a renegotiation of the production sharing contract. However, the initial field development was not a profitable undertaking, and the increase in output was insufficient to repay the total debt incurred by the Government for its development.

In the past year production has fallen and costs risen, to the point where current income no longer covers current costs. Given the likely continued decline in the volume of output, the Government should be advised to close down field operations and sell its drilling rig. The overall project performance is rated as satisfactory, but its sustainability is unlikely, and the institutional development is rated as substantial.

No audit is planned.

Attachment





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(CREDIT 1503-BEN)****TABLE OF CONTENTS**

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**PROJECT COMPLETION REPORT**

**REPUBLIC OF BENIN**

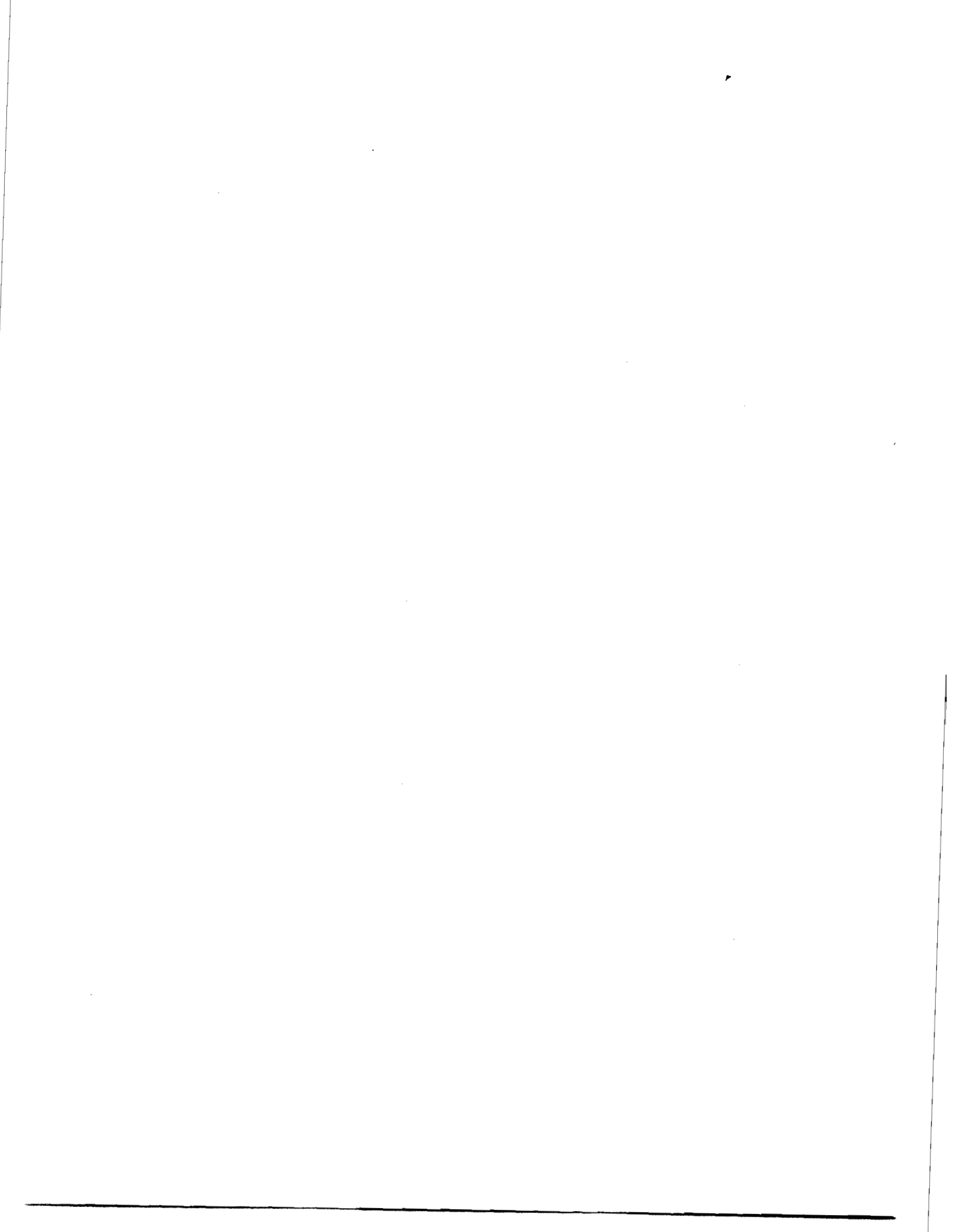
**SEME OIL FIELD DEVELOPMENT PROJECT**  
**(CREDIT 1503-BEN)**

**PREFACE**

This is the Project Completion Report (PCR) for the Seme Oil Field Development Project for which Credit 1503-BEN in the amount of US\$18 million was approved on May 19, 1984. The Credit was closed on February 28, 1991, four years and five months behind schedule. The last disbursement was on June 27, 1991.

This PCR was prepared jointly by the Africa Region Technical Department, Industry and Energy Division (Preface, Evaluation Summary, Parts I and III), and the Borrower (Part II).

Preparation of this PCR is based, *inter alia*, on the Staff Appraisal Report, the Credit Agreement, supervision reports, correspondence between the Bank and the Borrower, internal Bank memoranda and miscellaneous technical reports.





## PROJECT COMPLETION REPORT

### REPUBLIC OF BENIN

### SEME OIL FIELD DEVELOPMENT PROJECT (CREDIT 1503-BEN)

### EVALUATION SUMMARY

#### Background

1. In 1968, off the coast of the Republic of Benin, an American company discovered the Seme oil field, but considered it as marginal and relinquished it. In May 1979, under a service contract, and a US\$110 million loan, guaranteed by the Norwegian Government, the Government entrusted the field development to the Norwegian oil company SAGA (paragraphs 1.4-1.5).
2. The field was developed, and came into production in 1982, with an initial production of 5,000 barrels per day (bopd). However, it soon appeared that production could be increased through a second phase of field development (paragraph 1.10).

#### Objectives

3. The Association and the European Investment Bank undertook to finance this second phase of development. The main components of the Credit consisted of: (a) drilling of seven wells; and (b) improvement of production facilities (Paragraph 1.17).

#### Implementation of the Project

4. Between 1984 and 1985 two successful wells were drilled, and production was increased to an average of 7,000 bopd in 1985. However, Government's share remained limited to about 7 percent of production, the remaining part going to debt-servicing and excessive operating costs incurred by the Norwegian company. It should be noted that the Norwegian government agreed, in 1992, to forgive 50 percent of the lingering debt and to reschedule the remaining part with a ten year grace period (paragraphs 1.24-1.33).
5. After an interlude, during which the SAGA contract was cancelled and an oil sharing agreement was reached with an American oil company (which did not honor its commitments), the Government entrusted the production of Seme field to the American independent oil company Ashland. The operator drilled three more development wells, which partially palliated production decline from old wells (paragraphs 1.34-1.46).
6. During the interlude, a negotiation of the financial arrangements with Phase I lenders - in which the Bank played a decisive role - resulted in increasing Government's share of production from 7 percent to 20 percent (paragraphs 1.47-1.51).

#### Results

7. The project in itself was successful. Government's losses incurred during Phase I were partially palliated, during the Bank-financed Phase II, through both: (a) an increase in oil production through the addition of five producing wells; and (b) an increase in its share from oil production revenues through the new financing agreement with Phase I lenders. The current rate of return for

the project, approximately 40 percent (see part III, paragraph 6C), is below the 60 percent estimated at appraisal but is still an acceptable result. Government revenues mentioned in (a) and (b) above were included in the calculation of the rate of the return. Profit of Phase II was made possible partly because most of the costly production installations and facilities had been financed under phase I. In a similar process, any further development efforts, consisting of putting in production new reservoirs, would increase oil production significantly at low cost (paragraph 1.53).

8. From the beginning of production in 1982 until August 1991, debt service and inflated operating costs left the Government with a total revenue of US\$46.8 million (including royalties and incomes) out of an aggregate income from oil sales of US\$283.9 million, and aggregate expenditures in excess of US\$250 million. Government financial participation in the project was US\$27 million during the same period. The Net Present Value of Government's Phase I and II investments, evaluated with a 10 percent discount factor, is minus US\$146 million. Considering only the revenue in cash obtained by the government from Phase II (not including the financial cost related to Phase I loan capital) the net present value of the government, from 1984 to 1994, calculated with a 10 percent discount factor, is U.S.\$ minus 15 million (paragraphs 1.54-1.55 and part III paragraph F).

### Sustainability

9. The Government's revenues stemming from the production of the Seme field will not outlast the life of the field. The forecasted life of the field, as it is presently developed, does not extend beyond the year 1993. Development of deep reservoirs could prolong the economic life of the field into the next decade (paragraph 1.57).

### Conclusions

10. Before entering into a service contract with Saga, the Government had vainly attempted to find an oil company willing to enter into a development contract for the Seme field. At that time, based on its wide knowledge of the oil industry, the Bank should have assisted the Government in its search for a suitable partner, with financing capability and technical qualifications to develop the field under a concession or an oil-sharing contract.

11. During the prolonged preparation of the project, the Bank was apprised of SPB's arrangement, including the excessive number of Norwegian expatriates maintained in Benin, and the company's unreasonable operating costs, mainly related to the purchase of a drilling platform, the Amazone. Decreasing the number of expatriates and streamlining the operating costs (*inter alia* by selling the Amazone) should have been included as preliminary conditions of the project.

12. The rate of return of Phase I is approximately 12 percent, which is less than half of the rate of return of the Bank's project. Furthermore, this positive rate of return is artificial since it stems from: (a) SAGA's exaggerated initial rate of production (see Appendix 2); and (b) the currently high international price of petroleum products. The high rate of production, which probably damaged the reservoir and was responsible for the sharp decline in field production, resulted in high initial benefits - the main source of the fair rate of return of Phase I - but was actually detrimental to the overall rate of recovery of the field and to the government's interest.

13. Although slowed by the participation of the bank to the project, the production decline started as early as the end of 1985, and was confirmed during the following years: in 1989 the production was half of the 1984 peak value (which had been reached at the end of the first year of production). The operating costs (deriving partly from the utilization of the amazone platform and

two supply boats as purchased by Saga) remained very high and the declining field revenues were at best marginal during this period. Since the "Projet Pétrolier de Sèmè" is currently losing money for each barrel produced, the government should be advised to close the field immediately. The oil wells should be equipped with light cement plugs, easy to drill through in case it was determined that the wells could be reentered and production could be re-started.

14. Under a new petroleum project, consultants are carrying out a work program aimed at reducing operating costs, and promoting the development of the field (including exploring lateral entrapment and deep reserves to the oil industry. This consideration should not preclude the closure of the field waiting on a (possible) new entrant which will be capable to operate an accurate diagnosis of the field, provisionally closed or producing at a loss.



# **PROJECT COMPLETION REPORT**

## **REPUBLIC OF BENIN**

### **SEME OIL FIELD DEVELOPMENT PROJECT** **(CREDIT 1503-BEN)**

#### **PART I: PROJECT REVIEW FROM BANK'S PERSPECTIVE**

##### **A. Project Identity**

Name	: Seme Oil Field Phase II Development Project
Credit Number	: Credit 1503-BEN
RVP Unit	: Africa Region
Country	: Benin
Sector	: Energy
Subsector	: Petroleum

##### **B. Background**

1.1. Benin is a small, poor nation which had a population of 3.5 million in 1982 with an estimated per capita GDP of US\$280. Agriculture, the most important sector of the economy, accounts for 40 percent of GDP and 36 percent of foreign exchange earnings. There is a small industrial sector consisting of a few import substitution and agricultural processing plants. It contributed an estimated 11 percent to GDP in 1982. The tertiary sector is dominated by trade and transit activities that link economic activity in Benin to conditions existing in neighboring economies.

1.2. Because of this economic status, Benin's energy consumption—230 kg of oil equivalent per capita in 1982—was among the lowest in the world. Traditional fuels, primarily wood and charcoal, satisfy 87 percent of energy needs, the rest being met by imported petroleum products (11 percent) and imported hydropower (2 percent). The country's major energy sources are dense forests and savannahs, covering about 78,000 km<sup>2</sup>, but their indiscriminate use is leading to rapid deforestation near cities and villages.

1.3. The hydrocarbon resources were not yet fully explored in 1982 and the Government planned to promote acreage to foreign oil companies under an exploration promotion program financed under Credit 1207-BEN. (see paragraph 6 below). The country's main sedimentary area covers about 15,000 km<sup>2</sup>, of which only 2,000 km<sup>2</sup> on the continental shelf (up to 200 meter water in depth) seem to have a fair hydrocarbon potential. Benin's coastal basin belongs to the Dahomey Embayment, a small geological province different from neighboring basins in both its stratigraphic sequence and tectonic features.

1.4. Two foreign oil companies, Union Oil (1965-1972) and Shell Oil (1971-1975), had explored for petroleum in offshore Benin, shooting 6,000 km of seismic lines and drilling nine exploratory wells. In 1968, Union Oil discovered the Seme oil field 15 km off the coast in water depths ranging from 20 to 54 m. In late 1973, it proposed a development plan to the Government but negotiations fell through and Union Oil relinquished its exploration acreage, given the expected internal rate of return of the development scheme by industry standards under the applicable fiscal

terms. For the same reason, subsequent negotiations with several oil companies did not bring about an agreement to develop the Seme field on a concession basis.

1.5. The Government decided in 1978 to develop the field on its own with the support of the Norwegian Government. In May 1979, the Government hired as operator under a service contract Saga Petroleum, A.S. (Saga), a private Norwegian oil company. Under its service contract, Saga became the Government's authorized agent for all field development, production and marketing operations, as well as for securing financing for the project. Saga had created a wholly-owned subsidiary, Saga Petroleum Benin A.S. (SPB), registered in Norway, with a branch office in Benin.

1.6. During that period, the Government repeatedly indicated that it was not seeking IDA financing for the initial phase of the Seme oil field development. However, in May 1979, the Government invited the Association to consider financing the second phase development of the field (see paragraph 9 below).

1.7. SPB employed 50 expatriates (with an extra 20 expatriates of contracting companies) and 310 Beninese staff, including 104 technicians which were progressively trained under the Credit 1207-BEN (see paragraph 7 above). Furthermore, rather than renting, the operator purchased heavy equipment whenever necessary, such as the jack-up platform, the Amazone. Due to decisions such as these, the operating costs were far above international industry standards.

1.8. The Government exerted its supervision of SPB through Government representatives employed by SPB. These dual role of these representatives did not allow them to have the autonomy to effectively supervise SPB's activities.

1.9. Seme oil reserves appeared to be distributed in two independent fields: the main one, North Seme, and a smaller one, South Seme. Saga envisaged the development of the fields in two phases: Phase I, where 9.8 million barrels would have been recovered by natural depletion with six wells, and Phase II, originally envisaged as a secondary recovery project, where an additional 11.9 million barrels would be recovered by water injection.

1.10. Phase I included mainly the construction of a jack-up platform for drilling and carrying out in-the-well operations (workovers), three wellhead platforms (P1 to P3), and an onshore tank farm. Owing to delays resulting from drilling of a dry well, and an accident with the jack-up platform, the field started producing commercially only on October 31, 1982, and the first crude shipment took place on 2 million barrels as of March 1, 1984. Production from five wells averaged 7,300 barrels per day in the months of January-March 1984. The rate of production was probably excessive with regard to the preservation of the reservoirs, since the field production, after 1985, never reached half of the 1984 peak production.

1.11. Investments for Phase I amounted to approximately US\$133 million including the financial costs (interest during construction was about US\$19 million). The Government had invested US\$13 million equity in the project in 1980. A blend of commercial loans and export credits totalling about US\$120 million were secured from Norwegian banks (US\$112 million) with the guarantee of the Norwegian Export Guarantee Institute (Guaranti-Institutte for Eksportkreditt - GIEK), and a UK bank (US\$8 million) with the guarantee of the British Export Credit Guarantee Department (ECGD). The balance of financing requirements (US\$7 million) was obtained from the project cash flow. The loans and export credits are repaid through a security arrangement, whereby all sales proceeds are deposited in a trustee account managed by a Norwegian bank.

1.12. The financial performance of Phase I had been unsatisfactory because of delays in production and a drop in oil prices. At this stage, it would have been necessary to inject equity capital in the project. In late 1982 and 1983, SPB was operating the field on a precarious cash-flow basis, and its tight debt service left small margin for delay and/or a decrease in revenues, resulting from a decline of production, or a further drop of oil prices on the international market. In December 1983, the Beninese Government and the Phase I lenders agreed to reschedule debt payments.

1.13. The production history and reservoir simulation studies indicated the existence of a partial natural water drive, and consequently the above-mentioned secondary recovery project through water or gas injection was not justified. On the other hand, a step-out confirmation well, drilled in July 1983, had established the validity of a western extension of the field, of which development would be financed under the Phase II project. Furthermore, this Phase also would include the delineation of other potential field extensions identified to the north and the northwest of the field, and the testing of a gas section in the deeper zone which had been penetrated by a production well drilled in March 1983. Components of Phase II were accordingly modified.

### **C. Project Objectives and Description**

1.14. In July 1982, the Government, following up with its May 1979 request, officially applied for IDA and EIB assistance to finance Phase II. However, due to a change in reservoir behavior and interpretation, the definition of the final requested project scope was delayed until the last quarter of 1983. The requested project was in logical continuation of the first-phase development of the Seme field. Its basic objective was to fully develop the proven reserves, including western extension of the field, and to delineate possible additional reserves to ensure optimum development of the field.

1.15. Both institutions, IDA and EIB, agreed with the Government request, under the provision that the financial structure existing under Phase I should be rehabilitated. The following actions were requested: (a) setting up of a Project Unit within the Government, assisted by an expatriate petroleum engineer-consultant, to closely monitor SPB's activities; (b) include amendments in the SPB contract reflecting the role of the Project Unit; (c) strengthen the financial structure of the project by providing additional equity through the proposed IDA Credit; and (d) decrease the annual debt service ratio by a rescheduling of Government's debt incurred under Phase I. These requests were met before the Credit became effective.

1.16. Two supplementary conditions--before Credit effectiveness--were included:(a) the extension of the Phase I security arrangement to EIB's credit; and (b) the contribution of cash flow to initial financing of Phase II (see paragraph 24 below).

1.17. The Project comprised the following components:

- (a) drilling of five development wells, which would increase the recovered hydrocarbon by 5.2 million barrels over the following eight years;
- (b) drilling of two confirmation wells, to prove the possible north and northwestern extension of the field;
- (c) modifications of Phase I installations to handle more liquid volume (emulsion treatment equipment, booster pumps, electrical power generation etc.);

- (d) monopod platforms would be constructed and installed to rapidly establish a development well, and, if warranted by the results of evaluation wells, put in production the two confirmation wells (see paragraph (b) above);
- (e) alternatively (see paragraph 20 below) (i) an integrated well and production platform was to be constructed to accommodate the last three development wells of the Phase II investment program and the confirmation well, if justified by positive results of this latter well. The platform would also include incremental production and living facilities; or (ii) if the results of the confirmation well were negative, Phase II program would be reduced to the erection of three monopods to put in production the last three development wells;
- (f) engineering and consulting services; and
- (g) a training program aimed at a progressive substitution of expatriates by local staff.

#### **D. Project Design and Organization**

1.18. The project was prepared by studies and surveys financed under the Credit 1207-BEN, which had been approved in February 1982 (Phase II feasibility study, Reservoir Optimization study, 3-dimensional (3D) seismic survey etc., for a complete list, see Part III - Section 6-D). The common preparation of the project by Bank's staff and Government's officials led to a clear foundation for the project, which was apparently well understood by all relevant parties.

1.19. The design of the project led to organizing its implementation in two stages: (a) the first stage included the drilling of the first two development wells and the two confirmation wells. The second stage would consist of either the construction of an integrated development platform and the drilling from this platform of the three last development wells (if the results of the confirmation wells were positive), or the construction of three monopods to develop the three last development wells (if the results of the confirmation wells were negative). In the second case, the project's cost would be reduced.

1.20. It was agreed that the Government would continue to employ SPB, under an amended contract (see paragraph 15 above) as Project Management Service Company to assist in developing and exploiting the Seme field. In addition to its headquarters in Cotonou, SPB would have a Phase II development management team based in Oslo, which would ensure the detailed engineering, procurement and supervision during construction and installations of Phase II production facilities. This team would be dismantled with the installation of the integrated platform.

1.21. In accordance with the Association's conditions (see paragraph 15 above) a Petroleum Unit was created, which reported directly to the Minister of Industry, Mines and Energy. The main tasks of the Unit were to supervise SPB's service contract and activities, and to serve as liaison with SPB, financial institutions, Government's agencies. The Unit was staffed with Beninese professionals having received both theoretical and on-the-job training under Credit 1207-BEN. It was assisted by a consultant hired in June 1984.

1.22. The project was estimated to cost US\$45.3 million. This amount covered the case of the construction of an integrated platform, provided the confirmation wells yielded positive results. In



the event that results of the confirmation wells were negative, the integrated platform would be substituted by three monopods, and the project cost would be reduced to US\$34.5 million.

1.23. As indicated above (see paragraph 12) the Same project needed an equity injection, which the Government was not in a financial position to provide. The Association agreed to lend the Government US\$18 million. The European Investment Bank (EIB) agreed to co-finance Phase II (in an approximate amount of US\$15 million) to construct the production structures. The Government was to provide an equity contribution of US\$4.8 million. It was further agreed during negotiation that the Government would make arrangements, if necessary, to contract other loans and supplier's credits for an amount of US\$7.5 million. Conversely, in the event of a decrease in the project's cost brought on by negative results of the confirmation wells, the share of each donor would be reduced by about US\$1 million and the Government's share decreased to US\$3.5 million.

#### **E. Project Implementation**

1.24. The starting of the Credit was delayed by lengthy negotiations of SPB's amended service contract. Nine months elapsed between the Credit's signing date and its effectiveness. The Credit was declared effective on May 26, 1985.

1.25. In order to start the implementation of Phase II earlier, the Government and the trustee guarantor (Guaranti-Instituttet for Eksportkredit - GIEK) agreed to draw the following from the Government's Phase II cash flow: (a) a US\$5 million amount representing Government's equity participation; and (b) a US\$8 million advance which was to be repaid by the loans from EIB and the Association.

1.26. SPB drilled a first production well, S-7, which was completed in late June and put in production in July 1984. The well was tested at 3,200 bopd with pumping, and at 1,270 bopd at free flow. The well was connected to the production network of the field.

1.27. After drilling the first well, however, SPB put on hold any further activities under Phase II, on the grounds that its amended service contract had not yet been signed. Upon the insistence of both the Government and the trustee guarantor, and as its amended contract had been substantially completed, SPB resumed its development activities in November 1984. The amended contract was eventually signed on March 4, 1985.

1.28. SPB resumed drilling the development well S-8 in mid-1985. Although S-8 encountered the reservoir below the oil/water contact (OWC) and was dry, S-8A, deviated from S-8, was drilled into the reservoir above the OWC and was put in production at a rate of 2,500 bopd.

1.29. The delineation wells, SC-2 and SC-3, were drilled respectively in December 1984-January 1985, and in September 1985 respectively. Both wells were dry, as the reservoir was encountered only a few feet below or over the oil/water contact. SC-2 was drilled to the gas zone. The latter was not tested, however, because the drilling platform was required for workover operations on the field.

1.30. The field did not extend to the North as it was expected. Assumed extension was based on interpretation of 3-D seismic results, due to unforeseen lateral changes of seismic wave velocity in the terrain over the reservoir.

1.31. Both wells S7 and S8 substantially increased the production of the field. Although completed dry, both so-called confirmation wells SC2 and SC3 contributed to a thorough delineation of the northern portion of the field, since both had identified the oil/water contact. Construction of an integrated platform was not justified, after the delineation well established a smaller producing reservoir than originally anticipated. The project cost was decreased accordingly (see paragraph 23 above). The request for a US\$8 million Government advance was consequently canceled, and the EIB's share project financing was decreased.

1.32. In the meantime, construction of platform P3 extension was completed, and all major equipment (including two additional generators, one diesel, one gas; one black oil separator, and a booster pump) was installed by September 1985.

1.33. By the end of 1984, the field had produced nearly seven million barrels of oil. Burdened with high operating costs, which the Bank was pressing to decrease but with no significant result, and debt-servicing, the Government share of sale proceeds was minimal (no more than 7 percent). High operating cost were combined with an excessive production rate, which probably damaged the reservoir. The government was highly dissatisfied with SPB.

1.34. Less than six months after the signature of the SPB contract, the Government informed the Bank, through a letter dated August 27, 1985, that it had decided to substitute for SPB a new entrant, the American company Pan Ocean.

1.35. According to press release, the Government had entered into a cooperation agreement with Pan Ocean company for an amount of US\$2 billion. In addition to the development of Seme field within the framework of an oil-sharing contract, this agreement included other development projects such as construction of an international airport, a hydropower dam, roads and irrigation networks.

1.36. As far as the Credit's implementation was concerned, this Government's unilateral action resulted in the following: (a) a rupture of the contractual framework, since the Credit Agreement had been entered into by the Bank with the Government, and not with a joint venture between the Government and a foreign private company; (b) a breach of the Development Credit Agreement, since neither the selection of the company nor the contractual arrangements with this company had been submitted for agreement to the Association (both the company's selection and the contractual arrangements were later found unsatisfactory to the Bank); (c) a breach of the security arrangement with co-financiers; and (d) technical issues regarding the appropriate method for maintaining of Seme field production during the change in operators.

1.37. With the agreement of Phase I co-financiers and trustee guarantors, the disbursements under the Credit were suspended on September 20, 1985. The Bank subsequently insisted that the Government: (a) obtain information about the new company's financial solvency and technical competence in offshore operations; and (b) modify the Pan Ocean contract substantially to provide greater protection of the Government's interests.

1.38. Pan Ocean had no experience in offshore fields development. Furthermore, during the company's period of operations, a high turnover of the local management staff occurred, reflecting the poor organizational capacity. During this period, the decrease of oil production and the increase in water cut were detrimental to Seme field's ongoing and future production.

1.39. Disappointed by the company's non-compliance with its financial and technical commitments and promises, the Government rescinded Pan Ocean's contract on May 15, 1986. At this point, if the implementation of the project was to be resumed at all, the Credit has to be re-appraised.

1.40. For future operations, the Government and the Association agreed that the interim operator would be the Seme Project Unit. It would contract on short term basis with individual personnel or labor contractor for necessary expatriates. In the meantime, the Government would seek a competent international company to act as operator for the field under a joint venture or a service contract.

1.41. Following this period of uncertainty, it was necessary to reassess the most appropriate development plan for the Seme field. The Bank requested that a reservoir engineering simulation study be carried out (the main issue to be addressed in the study was the progressively higher water cut). The results of the study would establish the groundwork for a revised development program to be implemented by a new operator for the field.

1.42. The previous Phase I lenders' security arrangement was cancelled by the Government in August 1985. During the preparation of a new financial framework, the Association insisted that a reasonable rate of return should accrue to the Government as a result of incremental investment, rather than let the revenue be absorbed by the debt service to Phase I lenders. Through its participation in meetings with lenders, guarantors and Government's representatives, the Association played the role of honest broker. The Association suggested that the Government obtain the assistance of a consultant to negotiate new financial arrangements agreeable to all parties concerned.

1.43. Upon a written request from the Government, the Association agreed in November 1986 to resume partial disbursements (with a US\$0.5 million ceiling). This funding was to assist the Government in meeting the following conditions set forth by the donors to resume disbursements: (a) a new operator's agreement with a competent oil company; (b) agreement on a revised field development plan; and (c) a formal agreement with Phase I co-financiers on the rescheduling of their loans.

1.44. In June 1987, the parties reached a full agreement with following major provisions: (a) the Government share on sale proceeds would total 20 percent (including export tax); (b) interest and principal were to be paid only with sale proceeds after deduction of Government's share and operating costs, with a roll over of unpaid interest and principal; and (c) the Norwegian share of the debt (about 90 percent of the total) would be converted to non-recourse at the end of Seme field's economic life. The financial agreements were eventually signed on May 27, 1988. Agreements were later on modified: the Norwegian Government agreed to forgive 50 percent of the debt and to reschedule the remaining part with a ten year grace period.

1.45. The consulting firm which had been selected to carry out the reservoir engineering study of the Seme field (see paragraphs 41 and 44 above) presented its final report in August 1988. It noted that water production in the field is a complex interaction of the natural advance of the aquifers, coning and mechanical problems. The firm also concluded that further incremental reserves could be produced by drilling three additional wells in both North and South Seme fields and installing larger submersible pumps. Its proposed development program was accepted by the Bank.

1.46. After establishing contact with 20 companies, the Government proposed the American Ashland Oil company to the Association, in September 1987, as new operator for the development of

the Seme oil field. The Association as well as the Phase I lenders and guarantors agreed with this choice. The contract was signed on April 28, 1988.

1.47. All preliminary conditions being met, the Association resumed the disbursements under the Credit on June 21, 1988. After an interlude of more than two years, the project was back on its tracks.

1.48. Through its fully owned subsidiary Ashland Exploration (Benin) Inc., the operator actively started its work with an expatriate team including five people. Between October 1988 and September 1990, in accordance with both the Credit Agreement commitments and the consultant's recommendations, the new operator drilled three development wells which were successfully completed (S-9 and S-10 on the Northern Seme, and S-11 on South Seme). Simultaneously, two monopods structures were constructed and subsequently transported and installed in the field, on S-10 and S-11 producing wells.

1.49. Due to a sharp increase of international drilling costs, the operator requested, and the Bank accepted, a reallocation of funds between the Credit's categories. This reallocation, dated March 3, 1989, is as follows:

**Table 1.1 Reallocation of Credit Funds  
(SDR Equivalent)**

	<b>Credit Agreement</b>	<b>Revised</b>
Cat.1 Drilling	7,560,000	12,000,000
Cat.2 Facilities	2,300,000	1,700,000
Cat.3 Monopods	1,900,000	2,000,000
Cat.4 Consultants	2,480,000	1,100,000
Cat.5 Training	190,000	150,000
Cat.6 Unallocated	<u>2,770,000</u>	<u>250,000</u>
<b>TOTAL</b>	<b>17,200,000</b>	<b>17,200,000</b>

1.50. On February 26, 1991, the company Williams Brothers Engineering Company acquired 100 percent of the stock of Ashland Exploration (Benin) Inc. Through a guarantee letter dated March 9, 1990, the new owner committed his new subsidiary to perform its work in conformity with its service contract, and to assign highly qualified and experienced personnel to the project. The Government, however, decided not to extend the company's contract beyond its expiration date (April 28, 1991) and opted to negotiate a direct contract with the expatriates operating the oil field.

#### Project Results

1.51. The Government's profits derived from the project are two-fold: (a) increased petroleum production resulting in enlarged revenues; and (b) increased Government share from 7 percent to 20 percent on overall production through modifications in the Phase I co-lenders financing arrangement (in which the Bank played a decisive role). Profits from both sources should be incorporated in the estimation of the project's rate of return.

1.52. Up to the closing date of the Credit, (February 28, 1991), the Seme field had produced approximately 16 million barrels of oil, of which about 10 million were produced during the life of the project. A little more than 3 million barrels stemmed from the five production wells financed under the Credit. Oil sales amounted to US\$57.2 million, of which the Government received US\$11.2 million due to recurrent high operating costs and payment of Phase I debt service.

1.53. Taking into account the increased production of the field, resulting from the wells financed under the credit, the project's rate of return is almost 40 percent which compares favorably with the 60 percent forecasted at appraisal time.

1.54. The rate of return of the whole Seme development project, including the Bank intervention, is 15.4 percent (see Appendix 1), compared with 11 percent as assessed at the time of appraisal. The same rate of return estimated without the Bank's participation, and with no modification in the Phase I financial arrangement, is 12.3 percent. Government's profit, however, was negative, due to both the debt service and Saga's excessive operating costs. While the net present value, calculated with a 10 percent discount factor, is minus US\$146 million for Phases I and II, it is only minus US\$15 million for Phase II alone. It should, however, be noted that the rate of return figures are mathematically skewed by the irregular cash flows (more details are presented in Part III, pages 19 and 20, and Appendices 1-3).

1.55. However, while recognizing that Saga's operating costs were excessive, it should be noted that a significant part of the company's operating expenses remained in the country, under the form of local expenses (hotels revenues, living allowances spent locally, transports, etc.), or products purchased locally.

1.56. The training efforts carried out under both Credit 1,207-BEN and 1503-BEN achieved their objectives, since the national staff of SPB managed the production of the Seme field by themselves during a nearly three-year period.

#### Project Sustainability

1.57. Production from the Seme field, as it is presently developed, is expected to cease before 1993, at a loss for the project. However, for a relatively low cost, deeper zones could be thoroughly tested, and, if results of the tests are positive, developed. This would prolong the economic life of the field into the next decade.

#### Bank Performance

1.58. The project was well conceived and prepared, since its objectives were met beyond expectation. However, during the appraisal process, since the Bank had become familiar with the conditions of the Seme field development, it should have been concerned from the start by SPB's poor performance and its excessive operating costs. Decreasing SPB's operating costs to a level consistent with international industry standard should have been a preliminary condition to the Credit.

1.59. During the supervision phase, the role of an "honest broker" played by the Bank was appreciated by the Government as well as by Phase I co-financiers. This role was instrumental in reaching an agreement between all parties concerned. The resulting production allowed for a

significant increase of Government's share in the hydrocarbon sales (from 7 percent to 20 percent) generating incremental revenues of about US\$13 million.

#### Borrower Performance

1.60. National professionals drew a maximum profit from the training program provided under both Credit 1027-BEN and Credit 1503-BEN. They made substantial progress in technical and managerial areas throughout the implementation of both projects. Between May 15, 1986 (date of the rescission of Pan Ocean contract) and April 28, 1988 (date of the signature of Ashland contract), production of the Seme field and the sale of petroleum were satisfactorily managed by local professionals.

1.61. The Borrower kept the Bank regularly informed about the contractors' development and production activities, and, as a rule, followed the Credit covenants, with the notable exception of the Pan Ocean interlude. The Borrower's action, however, was probably motivated partially by its feeling that, under the Saga arrangement, the Government had taken all the risk but was getting little benefit from the production in return. Ultimately, however, the Borrower's actions were detrimental not only to the ultimate oil recovery from the field but also to the image of the country with the oil industry.

#### Project Relationship

1.62. The implementation of the project was marked by a mutual acknowledgement between the Government and the Bank for their respective technical competence. This reciprocal esteem assisted in clearing the most delicate phases of the Project, while maintaining a constructive dialogue.

1.63. The Bank was successful in its role as intermediary between the Government and Phase I co-financiers, in particular the Norwegian participants. Once the different parties became used to seeing the Bank play this role, they invited the Bank's team to their meetings and requested its advice on all important issues.

#### Consulting Services

1.64. Contractors played an important role in the project since they were successively hired to manage the development and production of the Seme field. Their overall behavior varied from company to company. The first contractor was interested in gaining at the time money and international experience, and trained its own personal at the expenses of Government revenues from the Seme field. The objective of the second one was probably to make quick money. The third contractor, hired in 1988, performed its work satisfactorily, with limited operating costs.

#### Project Documentation and Data

1.65. Abundant documents in Bank files assisted in the drafting of this PCR. However, supplementary information had to be requested from the Government for the estimation of the project's rate of return.

1.66. The President's report provided a useful framework for the project, since different hypotheses regarding the project's initial results, and the subsequent action to be taken, were carefully described in the document.

**PROJECT COMPLETION REPORT**

**REPUBLIC OF BENIN**

**SEME OIL FIELD DEVELOPMENT PROJECT**  
**(CREDIT 1503-BEN)**

**PART II: PROJECT REVIEW FROM BORROWER'S PERSPECTIVE**

2.1. The Benin Government appreciates the impact of the World Bank through the Credit 1503 BEN, its performance, its relationship with the Government of Benin and the other co-financiers, and the lessons which can be noted from such cooperation.

**A. Appreciation of the Results of Phase II**

- (a) With the implementation of Phase II, the production of Seme Oil field has increased. From 1982 to 1987 10,819 barrels of crude have been produced i.e. 12,8 percent. This production has been increased at May 1991 to 15,765,000 barrels i.e. 18 percent of recovery. From 1983 to 1990, the proceeds have been evaluated to FCFA104,326 million, from which the Benin Government received FCFA12,072 million, while Norwegian and UK Banks received more than FCFA35,000 million. When SAGA's contract was cancelled, from a total proceeds of USD147 million, Benin has received USD3 million i.e. about 2 percent while Norway and UK received more than USD55 million i.e. about 38 percent.
- (b) The above unequal distribution resulted from the poor results of the negotiation of the 2nd Service Contract of SAGA PETROLEUM BENIN A/S. Although the Benin Government made an effort to convince SAGA and Norway to increase the part of the Government's proceeds, despite the assistance of the World Bank and Consultants, the results were not significant.
- (c) This situation was one of the reasons which persuaded the Government to cancel SAGA's contract in May 1985. This breach of the Financial Agreements resulted in: (a) negotiating a new financial agreement with Phase I lenders, in 1988, under which the Government proceeds were increased from 7 to 20 percent; and (b) a suspension of EIB and World Bank credit, which delayed the main activities of Phase II for roughly three years.
- (d) However, the new service contract signed in April 1988 with an American Company, Ashland Exploration (BENIN) INC., allowed Benin to reduce the service contracts' costs. It has not forecast any participation by the operator in the investment, therefore no main guarantee was given by ASHLAND for its activities.
- (e) The appointment of the Project Bureau has been very beneficial to the Project. During all those changes of operators, the Government Representative has supervised activities of the operators, and has coordinated the cooperation with the Financial Institutions of Phase I, EIB, IDA and the Government.

- (f) The Project Bureau has been very active for the negotiation of the Restructuring Agreements, the choice of a new operator, the reestablishment of EIB and IDA loans etc.
- (g) The preliminary evaluation of deeper horizons of the reservoir of Seme Oil field has tentatively indicated that 11 million barrels of oil, 25 millions barrels of condensate and 309 billion cubic feet of gas could be recovered.
- (h) This evaluation needs to be confirmed by a geological and geophysical study before a final decision is made. Such reserves can be produced during a Phase III development. But in the meantime the Seme Oil field production should be maintained while actions are taken to prepare a Phase III Development Program.
- (i) Therefore the Benin Government has proposed to the World Bank a transitional development called Expansion Phase II. This Phase II was evaluated to 4.5 million USD and the following tasks have been planned:
  - (i) Deepen and completion of existing well S3
  - (ii) Test and recompletion of existing well S9
  - (iii) Recompletion of well S11
  - (iv) Phase III Engineering and reservoir studies.

2.2. The Bank and the Government had established a work program for a new World Bank project. All the technical preparation was completed when, in May 1991, the Bank decided not to finance the program. As such a decision was not forecast, the Project has been faced suddenly with a complex and difficult situation when Seme oil field production was decreasing. The World Bank has suggested Benin Government to give the "Project Pétrolier de Sémé" to a private Oil Company which would bring the necessary investment to proceed with the development.

2.3. No oil company, however, would be likely to accept to support the heavy debt of FCFA 23 billion which the Project owns to Phase I Lender according to the Restructuring Agreements. Therefore, the Benin Government started to negotiate the restructuring of the Project's debts into the public debts. The Government tried to obtain from the World Bank a Technical Assistance for USD 3.5 millions in October 1991 which would cover:

- (a) the Audit for the restructuring of Project Pétrolier de Sémé
- (b) Research and negotiation with an oil company for the continuing development of Project Pétrolier de Sémé
- (c) Restructuring of the Petroleum Sector of the Republic of Benin
- (d) Financing of Direction de l'Energie Priorities
- (e) Phase III Engineering and Reservoir studies.

This Technical Assistance has to be successful for the continuation of the development of the Seme Oil field.



2.4. The World Bank Representatives and Consultants have done a good job during the Phase II Development of Seme Oil field. They played a crucial role in the implementation of the Feasibility Study and the Financial Matrix of this project. The World Bank assisted the Government in the close monitoring of all the steps of the implementation, of the seismic acquisition and processing, reservoir study, engineering and construction.

2.5. The World Bank Representatives and Consultants have been efficiently involved in the negotiation with Phase I lenders, for the establishment of the Restructuring Agreements which increase Benin's proceeds, and the negotiation and the signature of the Service Contract with ASHLAND EXPLORATION (BENIN) INC. on April 1988.

2.6. At the end of the Phase II development in December 1990, the results of drilling and tests have tentatively indicated that gas, condensate and oil can be produced from deeper horizons. Evaluation of the potential of this discovery was the main objective of Phase II extension credit which the Government requested from the World Bank (see paragraphs 3 and 4 above). Such a credit would have made it easier the promotion of exploration of the Beninese basin.

2.7. Except for the cancellation of SAGA Contract during the Phase II Development, Benin Government implemented its commitments in accordance with the covenants set forth in the Credit Agreement and with the procurement guidelines. A proper local support had been provided to various service companies, and consulting firms, involved in the implementation of the project components. The Government Representative, the Beninese staff and the operator demonstrated good will, keen interest and enthusiasm in performing their tasks. When SAGA's contract was cancelled, the Project Bureau and the Beninese staff have managed with skill to maintain the production till the choice of ASHLAND in April 1988 after the departure of PANOCO in May 1986.

2.8. When SAGA's contract was cancelled, there was a tight cooperation between EIB, World Bank, Phase I Lenders and Benin Government for the negotiation and the signature of the Restructuring Agreements, and the reestablishment of World Bank and EIB loans. However, the loan Seme 2 of EIB has been cancelled before any disbursement was made. The conditions resulting from the negotiations for the restructuring agreements are more favorable for the Benin Government (20 percent of proceeds instead of 7 percent). The World Bank Assistance has been very much appreciated for obtaining those results.

### Conclusions

- (a) Because of the bad position of the Benin Government as far as the distribution of proceeds is concerned, World Bank should have maintained its assistance for the continuation of the Phase II Program, and for resolving the financial issues with Phase I Lenders, Benin Government and EIB.
- (b) The establishment of the Project Bureau has allowed the Government to coordinate all the actions, of all the parties involved in this project, during the difficult situations.
- (c) For the future, all the Government interests and revenues which can be provided to Benin should be completely clarified, and the contract discussed accordingly, before a decision is made. The World Bank should continue to support the Government when it is faced with the Oil Companies and Banks.

**Lessons Learnt**

- (a) With the end of the Phase I and Phase II, the main part of Seme Oil field development has been achieved. This project did not provide substantial proceeds to the Government, even when its share increased from 7 percent to 20 percent, in April 1988.
- (b) The production of the field did not provide satisfactory revenues to the Government, because of the harshness of the Service Contract with SPB. Even though the Bank Credit 1503 BEN has allowed the increase of production, and provided good training to Beninese, the impact of Seme Oil field Project in the Benin economy is not so significant. Despite the assistance of the World Bank during the review of the SAGA Service Contract, the results which have been obtained in April 1985 were not fully satisfactory.

2.9. As far as the cancellation of the SPB Service Contract is concerned, the main lessons which come up are the following:

- (a) The Benin decision should have been taken at the end of Phase I program. Such a position would have avoided delaying the Phase II schedule for a long time.
  - (b) Although it was a breach of financial agreements, the cancellation eventually resulted in increased revenues for the Benin Government.
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**PROJECT COMPLETION REPORT**

**REPUBLIC OF BENIN**

**SEME OIL FIELD DEVELOPMENT PROJECT**  
**(CREDIT 1503-BEN)**

**PART III: PROJECT PROFILE**

1. Related Bank Credits

<b>Credit Title</b>	<b>Purpose</b>	<b>Year of Approval</b>	<b>Status</b>	<b>Comments</b>
1207-BEN	TA in Petroleum Sector	1982	Closed 12/31/86	Part of funds used to prepare the new Energy Project Cr. 1503-BEN

2. Project Time Table

<b>Item</b>	<b>Date Planned</b>	<b>Date Revised</b>	<b>Date Actual</b>
First Mention in files			07/18/78
Initial Government Request			07/82
Project Brief	05/27/82 (first)	10/28/82 (revised)	12/01/83 (final)
Issues Paper			01/23/84
Appraisal	11/82	12/83	12/83
Loan Committee	03/83	03/84	05/83
Negotiations	05/84		05/84
Board Presentation	06/83	05/84	05/19/84
Signing Date			08/26/84
Effectiveness Date	11/26/84	02/26/84	05/26/85
Closing Date	06/30/87	06/30/88	28/02/91
Completion Date	12/31/86	06/30/88	06/30/91

3. Credit Cumulative Disbursements

(US\$ million)

<b>Fiscal Year</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>	<b>89</b>	<b>90</b>	<b>91/92</b>
Appraisal	11.1	16.1	18				
Actual	0	3.4	3.5	3.9	9.9	17.5	21.9
Actual as % of Appraisal	0	21	19	21	55	97	116

Comments: An amount of US\$34,296 was cancelled when the project was closed.

4. Project Implementation

<b>Indicators</b>	<b>Appraisal Estimate</b>	<b>Actual Estimate</b>
Improvement of Installations	2nd half of 84	85-89
Drilling of first delineation well	2nd half of 84	12/85
Installation of first monopod	2nd half of 84	06-09/89
Installation of second monopod	2nd half of 85	06-09/85
Drilling of second delineation well	2nd half of 85	01/85
Installation of integrated platform	4th quarter 85	CANCELLED
Drilling of 3 deviate wells from the platform	end of 85, 1st half 86	CANCELLED

5. Project Costs and Financing

**A. Project Costs**  
(US\$ Million)

	<u>Appraisal Estimate</u>			<u>Revised Estimate</u>			<u>Actual</u>		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
Drilling of seven wells	1.1	11.9	12.5	8.6	15.7	24.3	8.6	15.6	24.2
Three monopods	0.3	5.5	5.8	0.0	5.6	5.6	0.0	5.4	5.4
Integrated prod. platform and Eqpmnt.	1.4	15.0	16.4	0.0	2.2	2.2	0.0	0.0	0.0
Modifications of Phase I Installations	0.2	1.2	1.4	0.0	2.2	2.2	0.0	2.4	2.4
Consulting Services	0.0	2.6	2.6	0.0	1.4	1.4	0.0	1.3	1.3
Training	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.2	0.2
Contingencies	0.5	41.8	45.3	8.6	27.6	36.2	8.6	24.9	33.5
<b>TOTAL</b>	<b>3.5</b>	<b>41.8</b>	<b>45.3</b>	<b>8.6</b>	<b>27.6</b>	<b>36.2</b>	<b>8.6</b>	<b>24.9</b>	<b>33.5</b>

Comments: Since the results of the delineation wells were negative (SC-2 and SC-3, see Part I - paragraphs 30-32), the scope of the project was not modified. The integrated platform was consequently not constructed and the aggregate project cost was accordingly decreased.

**B. Project Financing**  
(US\$ Million)

<b>Source</b>	<b>Planned</b>	<b>Revised</b>	<b>Final</b>
IDA	18.0	24.6	21.9
Co-financing Institution	15.0	3.8	3.0
Domestic	4.8	8.6	8.6
Other External Sources	<u>7.5</u>	<u>0.0</u>	<u>0.0</u>
<b>TOTAL</b>	<b>45.3</b>	<b>36.2</b>	<b>33.5</b>

6. Project Results

**A. Direct Benefits**

<b>Indicators</b>	<b>Appraisal Estimate</b>	<b>Closing Date Estimate</b>	<b>Full Development Estimate</b>
Incremental Export of Crude	5.2 MMB	3.1 MMB	NA
Incremental Agg. Cash Generation (US\$ Million)	137	57.2	NA

**B. Economic Impact**

N. R.

**C. Financial Impact Phase I  
Expenditures versus Revenues**

<b>US\$ million/FY</b>	<b>83</b>	<b>84</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>	<b>89</b>	<b>90</b>
Revenues	0.0	69.7	57.8	18.3	23.5	19	16.8	11.4
Expenditures	4.1	5.2	6.2	0.0	0.0	0.3	0.4	0.2
Operating Costs	<u>38.2</u>	<u>39.9</u>	<u>34.7</u>	0	<u>46.1</u>	<u>12.7</u>	<u>14.6</u>	<u>7.8</u>
<b>TOTAL</b>	<b>-42.3</b>	<b>24.6</b>	<b>16.9</b>	<b>18.3</b>	<b>-22.6</b>	<b>6.3</b>	<b>2.2</b>	<b>3.4</b>

Comment: Initial high rate of production, and interruption of technical expenses during Pan Ocean interlude, led to positive results during the initial years. However, while the production declined operating costs did not decrease and from 1989 onward they have more than offset the revenue from oil sales.

**D. Financial Impact Phase II  
Expenditures versus Revenues**

<b>US\$ million/FY</b>	<b>84</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>	<b>89</b>	<b>90</b>	<b>91</b>
Revenues (oil sales)	4.7	9.1	4.4	8.4	4.7	4.0	14.5	7.4
Revenues (increase in royalty)	10.4	2.4	3.0	2.5	2.2	1.5	1.4	0.0
Expenditures	.95	4.5	5.2	2.4	9.3	8.7	9.3	8.7
Operating Costs	<u>0.0</u>	<u>2.3</u>	<u>2.2</u>	<u>4.4</u>	<u>3.2</u>	<u>3.0</u>	<u>5.8</u>	<u>4.0</u>
<b>TOTAL</b>	<b>3.75</b>	<b>2.3</b>	<b>-3.0</b>	<b>1.6</b>	<b>-7.8</b>	<b>-7.7</b>	<b>-0.6</b>	<b>-5.3</b>

Comment: As in the case of Phase I, a promising start was rapidly followed by negative results. From 1988 onward, PPS is losing money by prolonging the production.

**E. Financial Impact Overall Project**

	<b>Bank's Project</b>	<b>Without Bank's Project</b>	<b>With Bank's Project</b>
<b>Financial Rate of Return</b>	39.79%	12.31%	15.43%

Comments: The rate of return of the project is not reliable, since, between 1984 to 1987, as shown in table above, revenues were higher than expenditures: inexpensive development wells were drilled and immediately connected with already existing production facilities. A minimum value of the rate of return was evaluated by pushing backward by one year annual expenditures. The result (230%) gives a minimum value of the internal rate of return of the project.

**F. Net Present Values of Government's Share in Project  
(US\$ million)**

<b>Year</b>	<b>84</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>	<b>89</b>	<b>90</b>
Phase I	0.8	14.9	3.5	6.3	2.4	3.2	2.3
Phase II	0.1	2.3	0.8	2.3	0.6	0.8	3.0

Based on both the table above and aggregate Government's expenditures, and calculated with a 10 percent discount factor, the Net Present Value (NPV) of Government's investment is listed below in US\$ (million):

Phase I	-130
Phase II	-15
Phases I and II	-146

*N.B. See also Appendices 1, 2 and 3 for additional details on the project's financial impact.*



**G. Studies**

<b>Studies</b>	<b>Purpose as Defined at Appraisal</b>	<b>Status</b>	<b>Impact of Study</b>
Feasibility of secondary recovery for the Seme Oil field	Appraisal of Project's Objectives	Completed	Target met
Feasibility Study for monopods	Appraisal of Project's Objectives	Completed	Was useful for obtaining early production
Study of Phase II integrated platform	Appraisal of Project's Objectives	Completed	Useless since integrated platform was not constructed
Seismic 3-D mapping	Location of Confirmation wells	Completed	See Part I paragraph 19
Study of modification of Saga service contract	Project's Preparation	Completed	Objective met
Seme field Reservoir Evaluation	Definition of a revised Development Program	Completed	Objective met

3.7. Status of Covenants

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<u>Covenants</u>	<u>Deadline for Compliance</u>	<u>Status</u>
providing required funds	NA	Met
Creation of a Petroleum Unit	Condition for Effectiveness	Met
Employment of a petroleum engineering consultant	Condition for Effectiveness	Met
Employment of management service company acceptable to IDA	Permanent Condition	Not always met (see Part I, paragraphs 34 to 36)
Furnishing periodical Reports	Permanent Condition	Met, with the exception of Pan Ocean interlude
Furnishing annual budgets and drilling programs	Permanent Condition	Met
Furnishing annual budgets and drilling programs	Permanent Condition	Met
Have accounts audited	Permanent Condition	Met with initial delay due to belated creation of an accounting procedure by Saga
Compliance with Bank guidelines for hiring consultants or procuring equipment	Permanent Condition	Met

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3.8. Use of Bank Resources

**A. Staff Inputs  
(staff weeks)**

<b>Stage of Project Cycle</b>	<b>Planned</b>	<b>Final</b>
Through Appraisal	NA	30.6
Appraisal through Board Approval	NA	57.2
Board Approval Through Effectiveness	NA	25.5
Supervision	NA	172.7
<b>Total</b>		<b>286</b>

**B. Missions**

Stage of Project Cycle	Month/Year	Number of persons	Days in field	Specialization represented 1/	Rating Status 2/
Identification through Appraisal	03/82	3	3	FA PE	1
	06/82	3	7	FA PE	1
	07/82	2	3	FA	1
	03/83	3	7	FA PE	1
	10/83	4	6	FA PE GST	1
	12/83	4	3	FA PE	1
Supervision I	11/84	2	5	FA PE	2
	II 03/85	3	5	FA PE GST	2
	III 06/85	4	3	FA PE GST	1
	IV 10/85	5	6	A PE GST LE	n.a.
	V 03/86	3	7	FA PE	4
	VI 04/86	3	3	FA PE	n.a.
	VII 06/86	3	7	FA	4
	VIII 08/86	2	3	EC PE	n.a.
	IX 10/86	2	10	EC PE LEG	n.a.
	X 12/86	6	6	FA PE GST	n.a.
	XI 09/87	2	7	PE EC	n.a.
	XII 04/88	1	4	LEG	n.a.
	XIII 06/88	2	6	PE LEG	n.a.
	XIV 10/90	2		EC PO	1
	XV 03/91	1	4	GST	n.a.
	XVI 03/91	1	16	PO	n.a.

1/ FA = Financial Analyst  
 EC = Economist  
 PE = Petroleum Engineer  
 GST = Geologist/Geophysicist  
 LEG = Lawyer  
 PO = Power Engineer

2/ 1 = Problem-free or minor problems  
 2 = Moderate problems  
 4 = Major problems

**SEME Petroleum Project—Financial Impact (US\$ Million)**

<b>PHASE I</b>					
	INV.	AMORT.	OP. COST.	REV.	CASH FLOW
1983	4.10	3.28	38.20	0.00	-41.48
1984	5.20	4.16	39.90	69.70	25.64
1985	6.20	4.96	34.70	57.80	18.14
1986	0.00	0.00	0.00	18.30	18.30
1987	0.00	0.00	46.10	23.50	-22.60
1988	0.30	0.24	12.70	19.00	6.06
1989	0.40	0.32	14.60	16.80	1.88
1990	0.20	0.16	7.80	11.40	3.44
1991	0.00	0.00	8.30	11.30	3.00
1992	0.00	0.00	7.00	9.00	2.00
1993	0.00	0.00	7.00	7.00	0.00
1994	0.00	0.00	7.00	5.00	-2.00
1995	0.00	0.00	7.00	4.00	-3.00
1996	0.00	0.00	7.00	3.00	-4.00

IRR 12.31%

<b>PHASE I &amp; II</b>				
	INV.	OP. COST.	REV.(1)	CASH FLOW
1983	3.28	38.20	0.00	-41.48
1984	4.92	39.90	69.70	24.88
1985	8.57	36.99	63.11	17.55
1986	4.12	2.19	28.58	22.28
1987	4.12	50.54	28.47	-26.19
1988	2.17	15.86	28.49	10.46
1989	7.74	17.65	22.11	-3.27
1990	7.14	13.60	15.92	-4.82
1991	1.05	14.40	27.69	12.24
1992	1.51	10.10	17.36	5.75
1993	0.00	10.00	13.78	3.78
1994	0.00	10.00	9.52	-0.48
1995	0.00	10.00	7.39	-2.61
1996	0.00	10.00	5.26	-4.74

IRR 15.43%

<b>PHASE II</b>						
	INV.	AMORT.	OP. COST.	REV.	SUPER BENEFITS	CASH FLOW
1983	0.00	0.00	0.00	0.00	0.00	0.00
1984	0.95	0.76	0.00	0.00	0.00	-0.76
1985	4.51	3.61	2.29	4.70	0.61	-0.59
1986	5.15	4.12	2.19	9.10	1.18	3.98
1987	5.15	4.12	4.44	4.40	0.57	-3.59
1988	2.41	1.93	3.16	8.40	1.09	4.40
1989	9.27	7.42	3.05	4.70	0.61	-5.15
1990	8.72	6.98	5.80	4.00	0.52	-8.26
1991	1.31	1.05	6.10	14.50	1.89	9.24
1992	1.89	1.51	3.10	7.40	0.96	3.75
1993	0.00	0.00	3.00	6.00	0.78	3.78
1994	0.00	0.00	3.00	4.00	0.52	1.52
1995	0.00	0.00	3.00	3.00	0.39	0.39
1996	0.00	0.00	3.00	2.00	0.26	-0.74

IRR 39.79%

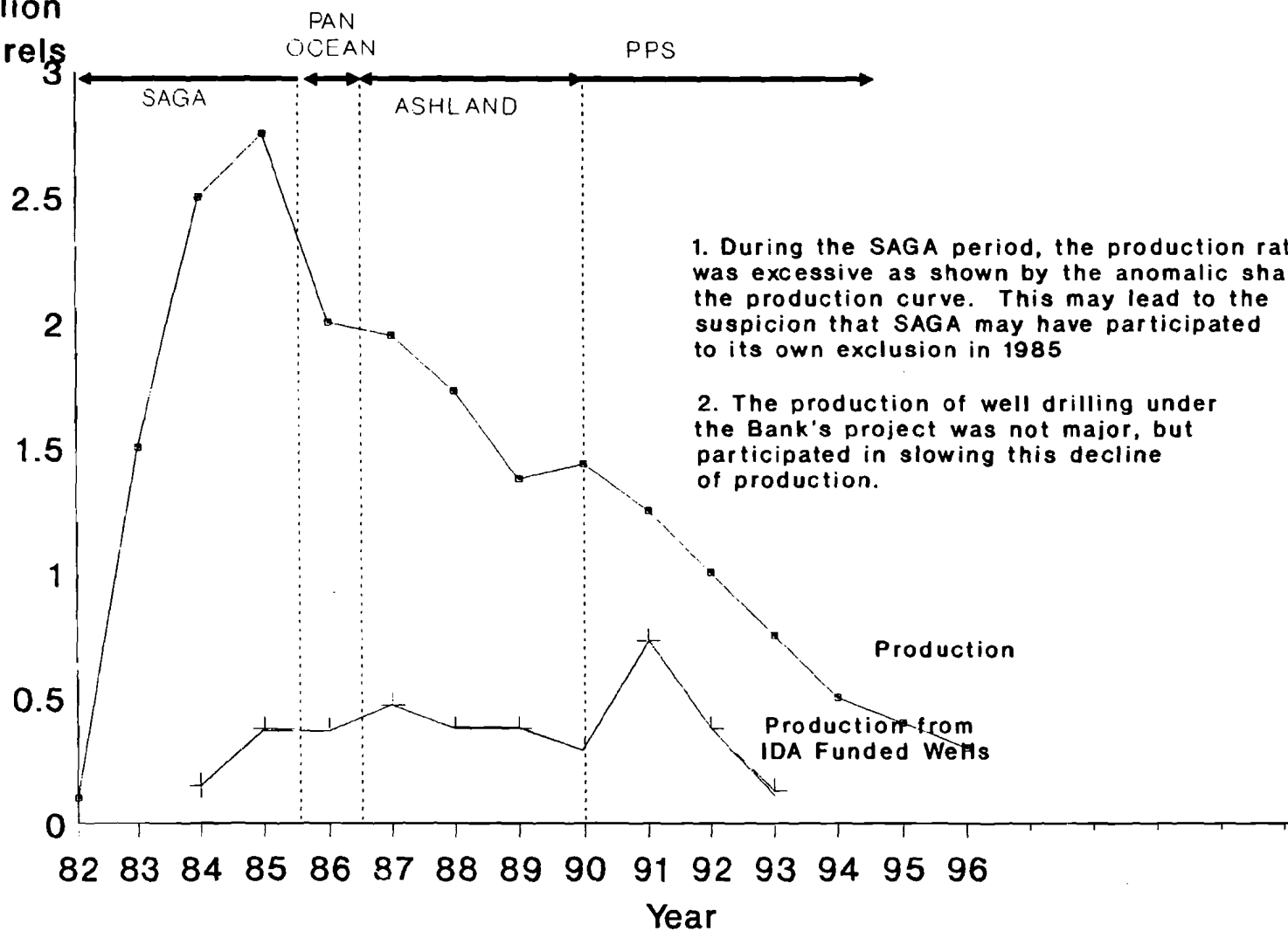
(1) Includes Super Benefit

Assumptions:

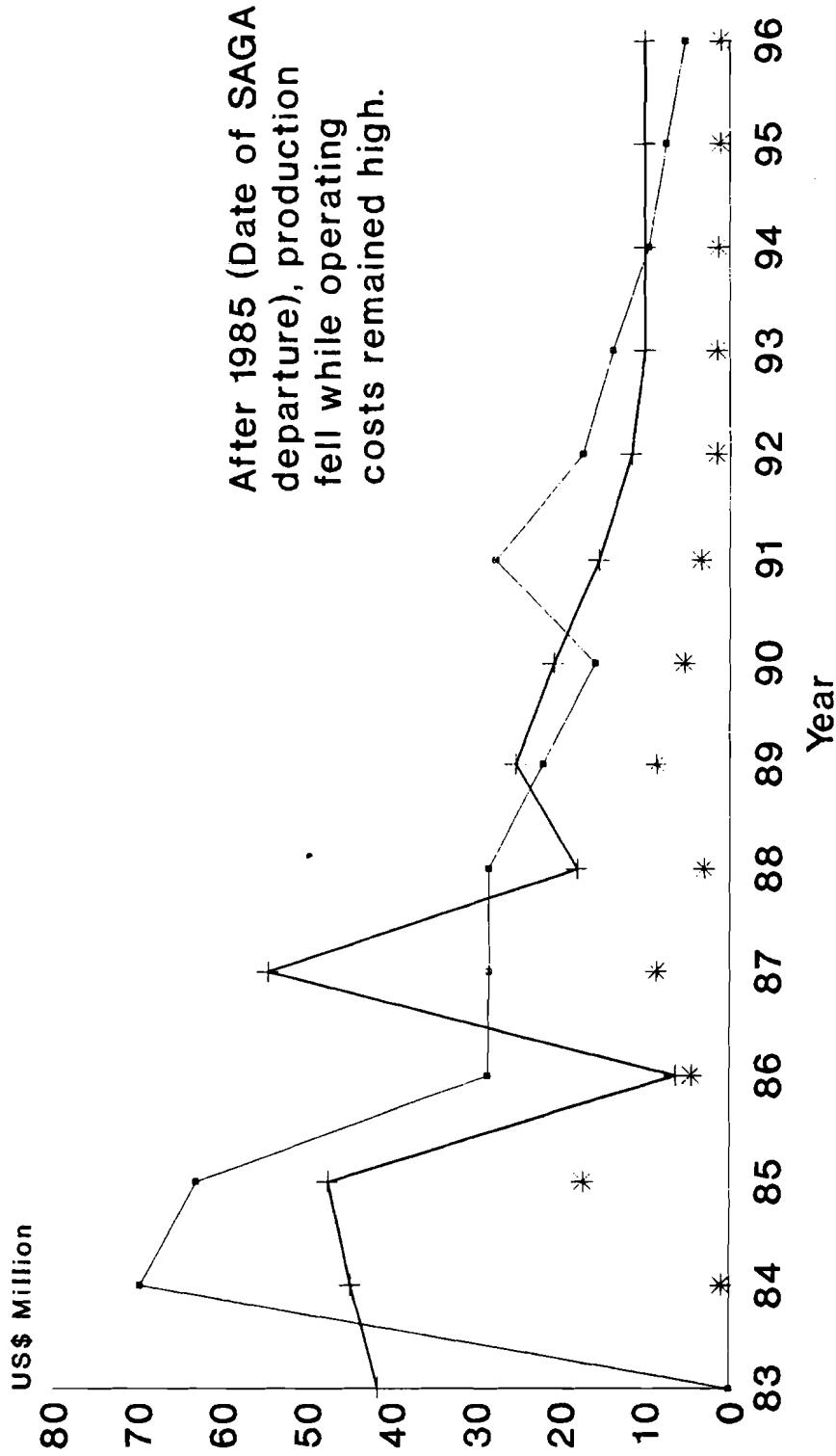
- (1) Super Premium is 13%
- (2) Amortization at 80% (based on presumption of future equipment sales)

# SEME Oil Field Production

Million  
Barrels



# SEME Oil Field Revenues vs. Expenditures



—●— Total Revenue    —+— Total Expenditure    \* Gov't Rev.











